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Lower-Cost Housing Research -- Interdisciplinary Graduate Study Programs

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LOWER-COST HOUSING RESEARCH - INTERDISCIPLINARY GRADUATE STUDY PROGRAMS

by

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Housing is becoming the most commanding building task of the immediate future. And solving the world's mass housing problems will be a crucial test for man's intellectual soberness and organizational capacity. By the end of this century, more dwellings than the total number mankind has built in its entire existence must be constructed. About half the population of Africa, Asia, and Latin America - over 1000 million people - are currently homeless or living in subnormal housing which is both hazardous and humiliating to the dwellers. Population growth and rural/urban migration lead to overcrowding and uncontrolled development of settlements around cities which lack basic amenities. These spontaneous squatments - rural solutions to urban problems - choke programs of economic development, reduce urban efficiency, and produce many varieties of environmental pollution. Considering the anticipated explosive increase in urbanization (Figure 1), existing substandard settlements are small in comparison with those yet to come. (1) If not planned for in advance, the majority of the world's population will be permanently living in substandard, often improvised dwellings and chaotic environments by the end of the century.

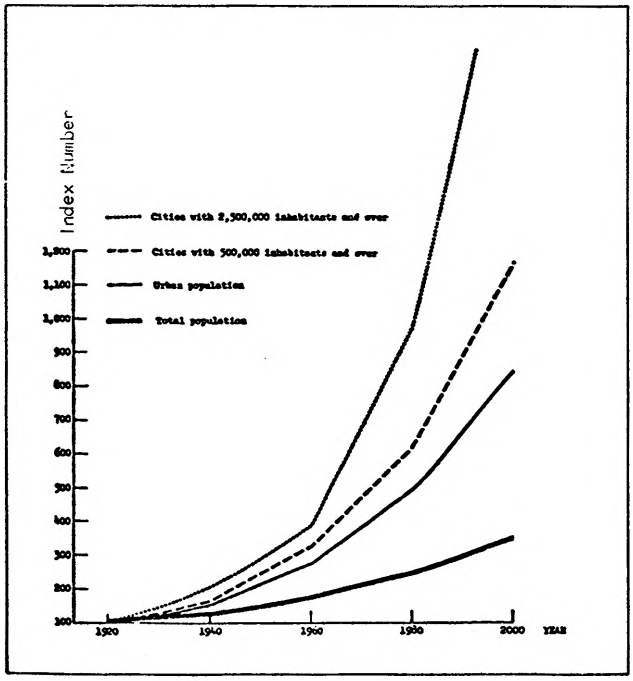

Fig. 1. Growth of total world population and urban population in various categories (1920 = 100). (2)

Prior to World War 2 squattering was a minor urban problem. Mass migration into the cities during the 1950's and 1960's, however, increased the squatter problem to severe proportions. Today, it is the rule rather than the exception that urban squatment communities compose 25 to 50 percent of the major cities in Asia, Africa and Latin America. (2) Until recently most governments considered the urban squatter communities temporary in nature, incidental occurrences that could be weeded out easily someday along the cities' road to progress. But despite occasional forcible evictions, urban squatments have proven to be surprisingly persistent. They continue to increase in number and in total population. They have, in fact, become a natural part of the urbanization process in many countries of the "third world". (3)

But urban shack-towns and other forms of improvised housing form only part of the desperate world housing situation. Deteriorating housing stock which is overcrowded and lacking in basic amenities produces squalid living conditions for another large portion of the world's population. Nor are these slums restricted to developing countries alone; they are traditional living quarters for the urban poor in many industrialized nations as well.

Rural areas also need to have existing unsound housing replaced and new dwelling units built to handle the natural increase in population. Although population densities in rural areas are less critical, general housing conditions for rural and small-town dwellers match the urban housing plight.

If natural population increase, urban migration, necessary replacement of obsolescent housing stock and a needed gradual elimination of the backlog in housing is taken into account, over 27 million dwelling units should currently be constructed annually in Africa, Asia and Latin America (Figure 2). (4) This conservative estimate adds up to well over 800 million dwelling units by the end of the century for these areas alone. It should be compared with an estimated 250 million dwelling units to be built during the same time span in the areas with more advanced economic and social resources: North America, Europe, the Soviet Union and Oceania. (4)

Housing required to provide for:	Africa	Asia	Latin America
Population increase (by natural growth and urban migration)	1.8	7.5	1.8
Replacement of obsolescent stock	1.2	7.4	1.0
Elimination of existing shortages (during 30 years)	0.8	4.9	0.7
Total 27.1	3.8	19.8	3.5

Fig. 2. Estimated average annual housing requirements 1970-75 (in millions of dwelling units). (4)

The magnitude of this giant building task - well over 800 million dwelling units to be built in less than 30 years in the "third world" alone - speaks for itself. It calls for annual housing programs for these regions which produce 8 to 10 dwellings per 1,000 inhabitants. Comparison of this target with the output attained by industrialized countries (the rate achieved in 1960 by France was 7.0, USA 7.1, Switzerland 9.3, Federal Republic of Germany 10.3 and Soviet Union 14.0 dwellings per 1,000 inhabitants) (5) helps to emphasize the formidable nature of the task confronting developing countries. The gap between mass housing need and supply is fundamental. Although the rate of provision of new and satisfactory housing lags far behind the rate of population increase, the countries' precarious economic situation does not permit them to allocate to housing the resources that would be required to develop low cost housing programs on a scale commensurate with the need. The majority of families, on the other hand, are too poor to be able without public assistance to own or rent housing of even minimum standards of habitability and sanitation. In an effort to overcome this typical dilemma painful failures are sometimes experienced.

If it is, for instance, decided to eradicate all urban squatments and slums and to rehouse their inhabitants in decent, safe and sanitary subsidized housing projects, the efforts normally will be an exercise in futility, incapable (given the scarcity of resources), of causing any effective amelioration of a serious housing crisis. (6)

Another conventional approach is a foreign aid program where sophisticated, capital-intensive, labor-saving machinery and equipment is imported as aid from an industrialized country to produce housing in a complex industrial process. The advanced countries possess much valid knowledge, know-how and experience which the poor countries urgently need to acquire and apply, but a high degree of selectivity is needed by the poor countries to relate them to their specific resource base. The most important criterion of the value and effectiveness of any kind of aid is the degree to which it helps the recipients to help themselves. Extensive import

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of plant and machinery largely by-passes the majority in developing countries, as it does not help the mass of people to help themselves, creating very few new jobs, straining the poor country's balance of payments and prolonging or even increasing its dependence on rich countries.

Another frequent mistake is the setting of unrealistically high standards, unrelated to the economic realities of a country. Floor space rates, standards for finish, fittings and amenities directly affect housing costs. Generally a house of relatively generous proportions but low standard of finishes and fittings would be the preferable solution for the low-income family. Plastered walls and ceilings, internal doors, special flooring, closets, etc., can in many cases be carried out later by the occupants. Though the standard of finishes may be low, the family will have ample space for normal living. It is much easier to improve the standard of finishes of a house once the owner is in occupation, than to enlarge the space. (7) Low cost housing standards, however, are frequently not flexible enough to respond in a sensitive way to the needs of a population which grows disproportionate to industrial development. Rigid ideals of basic standards of space, modern sanitation and construction techniques have to be tempered by a practical recognition of what is possible. Temporary acceptable standards are not a step toward slums but a pragmatic comprehension of the scale and urgency of the urban housing crisis in economic disadvantaged areas. (8)

The high cost of financing, the considerable cost of public administration in the management of the invested capital, and finally the frequent lack of realistic and competent designs for both lower-cost dwelling units and their urban environment also belong to the typical pattern of traditional but hopeless approaches to a problem that calls for innovative alternatives to cope with the realities of the situation.

Fortunately enough, many intelligent approaches adapted to typical conditions in the now-developing countries have been developed in the past. Aid and technical assistance have at times been used wisely to maximize the use of local labor and raw materials and to minimize dependence on imports and scarce foreign exchange. Many aided self-help programs in both rural and urban areas proved that families can build their own homes to a good standard, given adequate guidance and supervision and the incentive of home ownership. (9)

Governmental programs providing the site and the necessary public services like roads, environmental sanitation and utilities to make an area livable have been successful in Latin America in meeting large scale squatter-problems. People build their own homes and pay for the improved land and the provided public services over a period of time. As an alternative to paying rent for overcrowded accommodations, the system works well, offering the pride of home ownership to dwellers, and costing the government but a fraction of a full scale public housing project.

Cooperative housing associations have frequently been formed in Latin America by squatment communities with the aim to acquire legally from the government the land upon which their members squat. When successful the cooperative association becomes the owner-developers, and it decides on the improvement of the land. The individual members are called upon to see their particular interests in the light of the wider concerns of the community. And the leadership of the cooperative housing association must be willing to develop the people's participation in the decision making processes of the organization.

The level of standards has at times been realistically related to the actual situations and stages of development. Standards in Hong Kong might have been very low (25 sq. ft. per person, one room per family), but it offered the people better living conditions than they had before, and by permitting the people to settle down, housing made a solid contribution to industrialization. Hong Kong's first resettlement blocks completed in 1955 were primitive in design and spartan in living facilities. A decade later the newest housing facilities show more variation in design, imagination in land use, and larger living space. The new housing estates also demonstrate Hong Kong's economic success. The necessity of intensive land use forced both Hong Kong's and Singapore's governments to solve their massive housing needs by high-rise building programs. In spite of the complex technical-administrative system necessary to support high-rise housing, both governments were successful. (10) Their solutions, however, are unique as both cities have very limited land resources, and had to provide low cost housing for populations already accustomed to high-density urban life.

Planners, architects and administrators alike, faced with the realities of the social, economic and technological problems of rapid urbanization, begin to develop a sympathetic appreciation of local culture and resources. Many advances have been made by urban anthropologists regarding acculturation processes of rural people. Many public housing projects are conspicuous failures in this regard, as they respond little to the traditions of their intended occupants, whose cultures and value systems differ from region to region. (11) The ethnic character of a low-cost dwelling, as examples show, can well be expressed in its design, in size, uses and orientation of rooms, as well as in indigenous construction methods, materials and finishes. (12)

The core house or nuclear house concept has been used widely in recent years. Many variations exist, but the scheme basically consists of a sequence of phased construction steps. A fundamental shell - a roof, a room and basic sanitary and kitchen facilities - is gradually finished, improved, and expanded following a predetermined design pattern. The continuous upgrading of the initial deliberately unfinished home is normally done by the occupants themselves as need arises and their economic conditions improve. Timing of the house's growth is up to the occupants, who may even decide to use expansions of the home for a store, workshop or place for lodgers as a potential source to supplement the scarce family income.

The use of simple prefabricated construction components has also been effective in various efforts to provide housing at the lowest income level. The 20 foot long pleated asbestos cement roof panel developed in Central America is one of several good examples of the successful introduction of dimensionally well coordinated low-cost building components for universal use.

In developing countries, the change-over from traditional to industrialized construction methods follows different patterns than were experienced in the developed nations.

Lightweight and simple to handle components (such as doors, windows, kitchen cabinets, sinks, lintels, beams, purlins, as well as floor and roof slabs) if dimensionally coordinated, are preferred. They can be distributed in quantity and used by people without sophisticated technical skills. Raising the productivity of existing techniques without saving labor, they are one of the forms of prefabrication which poor communities can afford, operate and maintain for themselves. The eventual evolution of distinct systems of partial prefabrication, combined with labor-intensive traditional building methods, can be an effective next step in reducing costs of project housing and increasing flexibility both in function and appearance. (13)

But in spite of these and other positive advances, housing conditions in the now developing countries continue to deteriorate. The competent recommendations of the United Nations to build during the 1960 decade 10 houses annually per 1000 inhabitants were not followed. Less than one fifth of the production rate required to overcome the present shortage and keep pace with urban growth and replacement needs has been accomplished by most developing nations. Investment in housing represents about 1.5 to 2 percent of the national income in the developing countries, as against the 4 to 6 percent necessary to cope with the problem. (14) Although economists increasingly consider housing essential for accelerated economic and social development, most governments allocate a low priority to it in their development plans. The very magnitude of the problem tends to deter governments and international agencies from the enormous quantitative and qualitative efforts needed to meet the mass housing needs of the people.

No wonder that the Universities in their majority stayed aside. Architecture departments in particular tend to ignore low, lower and lowest-cost housing as much and as long as possible. The somewhat modest housing requirements of people in the vicious circle of poverty--who would like to work their way out of economic misery but whose lives are stuck in hopelessness, apathy and irrationality--are widely ignored. There are, fortunately, exceptions. Architecture schools set up urban workshop programs with field stations for advocacy planning and design in disadvantaged

communities. There is a world renowned Center for Urban Studies shared between two academic institutions, and even a two-year M. Architecture program "Urban Settlement Design in Developing Countries" with summer field work contacts. (15) Although some urban and regional planning departments already offer courses on problems of developing countries, the general picture remains disappointing. The number and types of housing experts available in the "third world" are not balanced with the demand, and students from these countries attending universities in industrialized nations do not find courses of study needed to prepare them to deal with their severe housing needs. The inappropriate values which these students bring back from their industrial host countries may be potentially even more damaging than the actual fact of a non-return, the "brain drain". (16) The typical design, engineering or planning student educated in this or another developed country is largely incapable of coping with the complex lower-cost mass housing problem faced now by the majority of the human family.

In such an obvious state of emergency, it is high time that universities focus their attention on the problems of mass housing needs. Universities--as thinking centers with a unique variety of professional disciplines, with their wealth of information resources, with their interest in research and dissemination of knowledge, with their constant use of logical tools including data processing, their objective status in society and their many highly motivated students who try to relate their education to real-world resolution of socio-technical problems--universities would be ideal institutions to contribute substantially with a sincere sense of commitment to this worldwide cause of the highest importance to mankind.

How could they actually contribute without changing the existing academic structures? First of all, a basic change in attitude is necessary. This may even imply a possible shifting in orientation and the order of priorities. On the undergraduate level, courses relating to lower cost housing and developing countries' conditions should be identified, improved and emphasized in the structure of the curricula. New courses may have to be added.

On the graduate level many opportunities exist to establish study programs relevant to the scale and complexity of the problem. They could probably best be structured in architecture, engineering, and planning but should be based on multi-disciplinary faculty which could include members from economics, sociology, urban anthropology, systems analysis, political science, management, law, financing, public health, etc. Emphasis on the particular program and composition of the faculty will vary according to university resources and willingness for interdepartmental cooperation.

The program should appeal to candidates from different disciplines with diverse areas of knowledge and range of skills. And the curriculum should be elastic enough to suit 3 types of students - the theoretically inclined, the practically oriented and the experimentally gifted.

The program should be research and development oriented, but at the same time permit students to achieve academic proficiency through an array of problem-specific courses, a high percentage of which necessarily will have to be taken outside the major department. The graduate student should have ample opportunity to specialize further through course electives. Students (on a part-time basis) should participate in research activities from the beginning, with concrete projects relating technology, humanities and science to problem solving in lower cost housing. They would contribute to multidisciplinary team approaches in problem definition and analysis, in formulating alternate solutions, in developing test criteria and testing models, and in implementating solutions with continuous feedback and evaluation mechanisms. Mere lecture courses should be kept to a minimum in favor of task-oriented seminars. This would encourage the student toward self-study and developing attitudes of actively inquiring instead of passively absorbing. Seminars may be considered in: systems analysis, cost-benefit analysis, research techniques, design methods, industrialized building, economics, housing sociology, urban anthropology, ecology, financing, management, materials, construction techniques and history of lower cost housing with critical analysis of selected case studies.

Great care should be given to the proper selection of research projects. Pilot demonstration projects should be conducted with the active participation of local populations to take advantage of their resources and expertise. Academic credit and supervision for off-campus work and study (professional internship) seems to be essential.

As the program should be career oriented, it should be appropriately identified and labeled with a degree. It could in addition offer continuing education services in the form of seminars and short courses. It could provide possibilities for advanced studies for educators, practitioners or researchers on leave of absence from their organizations. It should be concerned with the production and dissemination of educational material (printed and audio-visual) and may even consider the publication of a periodical. The program should further actively pursue the cooperation with institutes in developing countries.

Research should concentrate on areas of greatest need, e.g., low-rise, medium and high-density housing in the urban as well as the rural small-town context; integration of public services, utilities and community facilities; flexibility studies; urban habilitation of squatments; building technology utilizing local resources and idle manpower (17); criteria for optimal use of valuable external aid and technical assistance; the role of private industry in the mass production of cost-reducing prefabricated components; evaluation criteria for lower cost housing projects; basic design guidelines (Figure 3) (18); land use policy; environmental sanitation (19); technical innovations (like solar heating, sanitary equipment, roofs); development of community self-help programs, short and long-range; training and instruction in building techniques; etc. The possibilities for intelligent contribution are innumerable.

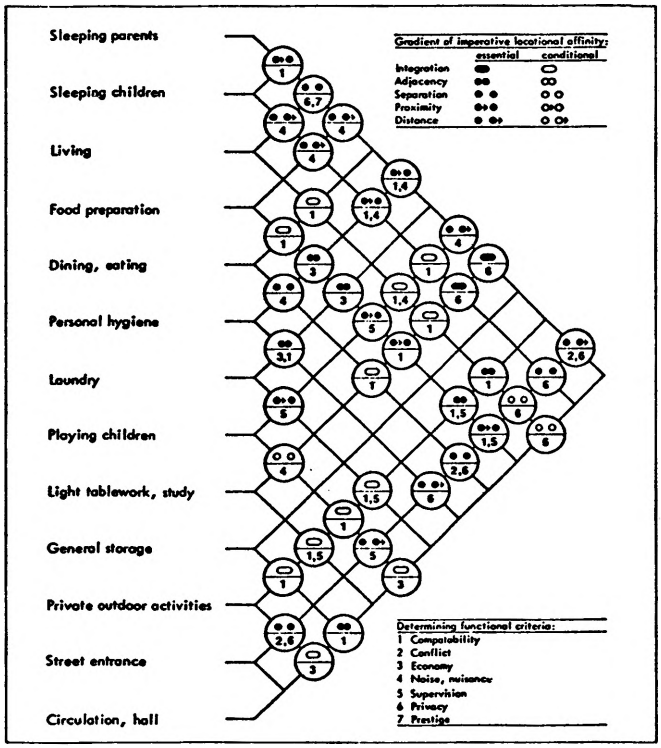

Fig. 3. Example of a matrix recommending basic functional space relationships of domestic activities in low-rise, low-cost housing. Each cell common to any two entities denotes imperatively the locational proximity between two activity areas and the determining reason for it. (18)

A basic orientation, responsible administrative decisions and the careful determination of objectives may initiate many different programs. They should, however, be subject to continuous critical evaluation and renewal in order to become fully effective. The world demand for lower-cost housing is unprecedented. Unprecedented efforts will be required to make any significant progress. Large projects, complex by nature, are necessary to ameliorate the need. Public money will be involved and failures can not be risked. Individuals are needed not with an idealistic orientation

but with competency in decision making, individuals who understand the complex relationships of constraints on mass housing construction, individuals who are determined to act. If slums and their present growth are not eliminated in the near future, by the year 2000 one billion people will live in them. Responsibility for future development is not the university's alone, but establishing multi-disciplinary programs of graduate studies in lower-cost housing research now is certainly not beyond their capabilities. In but a few years such programs could provide badly needed experts who could deal with mass housing construction under conditions so distinctively different from those in our industrialized societies. Rhetorical gestures in the field of serious social relevance alone will not help.

REFERENCES

1. The urban population in Latin America is growing at almost twice the continental rate and the cities are growing even more rapidly. (Preliminary studies on subnormal housing in Bogota, conducted by the Bouwcentrum de Colombia in 1969/70, state that this country has a national population growth of 3.5% per annum. Its capital city, Bogota, is growing at about 6.5%, and it is estimated that the population in urban subnormal housing districts is growing between 10 to 12%).
2. Problems and Priorities in Human Settlements, Report of the Secretary General, United Nations General Assembly, Housing, Building and Planning, August 1970.
3. R.P. Poethig, "The Squatters of Southeast Asia", Ekistics 183, Feb. 1971. Note the analytical work of Anthony Leeds, social anthropologist at the Univ. of Texas in Brazil. Also the work of John C. Turner in Latin America, widely reflected in the literature.
4. World Housing Conditions and Estimated Housing Requirements, Dept. of Economic and Social Affairs, United Nations, New York, 1965.
5. Annual Bulletin of Housing and Building Statistics for Europe 1960, United Nations, Geneva, 1962.
6. Colin Rosser, "Housing for the lowest income groups: the Calcutta experience", Ekistics 183, February 1971.
7. Alvaro Ortega, "World Housing Problems", International Asbestos-Cement Review ac 58, April 1970.
8. Methods for Establishing Targets and Standards for Housing and Environmental Development, Department of Economic and Social Affairs, United Nations, New York, 1968.
9. Margolis, Richard J., Self-Help Housing in Urban Areas, International Self-Help Housing Association, Washington, D.C., 1968. Manual on Self-Help Housing, Department of Economic and Social Affairs, United Nations, New York, 1964. Aided Self-Help Housing in Africa, Prepared for the Agency for International Development, US Dept. of Housing and Urban Development, Washington, (Ideas and Method Exchange No. 65).
10. First Decade in Public Housing, Housing and Development Board, Singapore Government, Singapore 1970.
11. Three case studies (Aswan Dam Resettlement, Caracas superblocks, Lagos rehousing scheme) in: Okigwe, Carla, Culture and Public Housing in Underdeveloped Countries, unpublished paper, submitted in Planning 1-2a, Harvard University, Graduate School of Design, 1967.
12. Example: Low cost housing project in Guermasa, Tunisia by the Bulgarian Arch. Tataroff utilizing masonry vaults throughout. The project was selected, among others, by the International Union of Architects for its basic documentation of successful low cost housing projects - the first of its kind. Forthcoming.
13. A few schemes of skeleton type 4-story construction for subsidized housing wherein the structural framework and roof alone is provided by the agency, and the flooring and cladding is left to be provided by the user himself, have recently been worked out by the Central Building Research Institute, India.
14. Committee on Housing, Building and Planning, Report of the Sixth Session (Sept. 1969), United Nations, New York, 1970.
15. MIT, under Prof. Horacio Caminos.
16. An interesting analogy to the "brain drain" experienced by developing countries regarding the design and planning professions is presented in: Gish, O., Doctor Migration and World Health, London, 1971.
17. Noteworthy theoretical work is currently conducted, among others, by the Intermediate Technology Development Group, 9 King Street, London WC2E 8HN, England; and at CIDOC Centro Intercultural de Documentacion, Rancho Tetela, Apdo. 479, Cuernavaca, Mexico.
18. Gunter Schmitz and Martin Reig, Functional Design Guidelines for Low Cost Housing, Monograph prepared for the United Nations Centre for Housing, Building and Planning, Architecture Research Center, Texas A&M University, Jan. 1971.
19. Cartillas de Saneamiento - Agua, Vivienda, Desechos, Comision Constructora e Ingenieria Sanitaria, Secretaria de Salubridad y Asistencia, Mexico D.F., 1971.